Executive Summary

The Federal Highway Administration (FHWA) and the Virginia Department of Transportation (VDOT) signed a process streamlining agreement in 2003 that defined the decision-making and approval process to be followed for a tiered environmental study of the I-81 corridor in Virginia (see Appendix A). In accordance with the agreement, FHWA and VDOT have prepared a Tier 1 Draft Environmental Impact Statement (DEIS) for the *I-81 Corridor Improvement Study*. The Tier 1 DEIS, prepared in accordance with the National Environmental Policy Act of 1969 (NEPA), identifies needs, develops solutions, and evaluates potential impacts associated with conceptual-level improvements along the entire 325-mile I-81 corridor in Virginia, as well as improvements to Norfolk Southern's Shenandoah and Piedmont rail lines in Virginia. The potential impacts of specific improvements would be analyzed in greater detail during Tier 2 if a "Build" concept (or portion of a "Build" concept) is advanced.

ES.1 NEPA Tiering Process

Tiering is a staged approach to NEPA referenced in the Council on Environmental Quality's (CEQ's) *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act* and in FHWA's *Environmental Impact and Related Procedures*. Tiering addresses broad programs and issues in initial (Tier 1) or systems level analyses, and analyzes more site-specific proposals and impacts in subsequent tier studies. The tiered process supports decision-making on issues that are ripe for decision and provides a means to preserve those decisions. This Tier 1 EIS is the vehicle for fact-based analyses that supports informed decision making on corridor-length issues. In accordance with the *Process Streamlining Agreement Between the Virginia Department of Transportation and the Federal Highway Administration on the Interstate 81 Corridor National Environmental Policy Act Process*, upon completion of the Tier 1 study, decisions will be made on:

- the improvement concepts for highway and rail facilities;
- advancing I-81 as a toll pilot under Section 1216(b) of the Transportation Equity Act for the 21st Century (TEA-21);
- projects with independent utility and logical termini to be studied in Tier 2;
- the types of Tier 2 NEPA document(s);
- the location of the corridor for studying alignments in Tier 2; and
- possible purchase of certain right-of-way parcels on a case-by-case basis.

In addition to these decisions, the Tier 1 DEIS documents existing and future needs along the corridor.

ES.2 Study Area

I-81 in Virginia runs for 325 miles in a southwest to northeast direction from western Virginia at the Tennessee border north to the West Virginia border. The highway passes through 21 cities and towns, and 13 counties. Conceptual-level improvements to the entire 325-mile length of I-81 in Virginia were evaluated based on the Purpose and Need (see below). For purposes of characterizing the affected environment, the I-81 study area ranges in width depending on the environmental resource considered, but generally extends 500 feet from either side of the I-81 outside edge of pavement. This width was used because, based on the needs, it is believed to represent the limits of where potential highway improvements are most likely to occur.

In addition to addressing the needs with highway improvements, the study evaluates the effectiveness of rail improvments in meeting the identified needs. Potential improvements to Norfolk Southern's Shenandoah and Piedmont rail lines, as described for Rail Concept 3, were evaluated. Rail Concept 3 was evaluated because it provides the most diversion of freight from truck to rail per dollar of investment. Since the Piedmont rail is geographically distant from I-81, a separate rail study area was also created. The rail study area consists of 13 discrete sections along existing Norfolk Southern's Piedmont and Shenandoah rail lines in Virginia. The length of the rail improvement sections range from less than ½ mile to 10 miles long, but most of the sections are between 1 and 2 miles long. For each rail section, resources were generally identified within 500 feet on either side of the rail centerline.

Figure ES-1 shows the I-81 and rail study areas.

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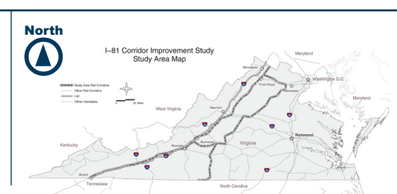

I-81 and Rail Study Areas

Figure
ES-1

I-81 CORRIDOR IMPROVEMENT STUDY

ES.3 Purpose and Need

The 325-mile stretch of I-81 within Virginia was originally constructed as a four-lane limited access highway. Since its completion, sections in Bristol, Wytheville and Christiansburg have been widened and reconstructed to accommodate the large increase in traffic. Truck climbing lanes also have been added in some sections. I-81 is relied upon for both local travel and interstate travel in the eastern United States. Virginia's portion of I-81 is critical to overall national system linkage. For interstate travel, its location provides a connection between the heavily populated northeast and the mid-southern states, as well as routes that connect to the Texas-Mexico border.

The Purpose and Need chapter evaluates both existing travel conditions and future needs in the year 2035. Detailed information on existing and 2035 transporation conditions are provided in the *I-81 Corridor Improvement Study Transportation Technical Report*. Existing and future transporation deficiencies on the interstate are summarized below:

- Capacity
  - Over the past 25 years (1978 to 2003), travel demands along the interstate have more than doubled and nearly tripled in some locations.
  - 2004 traffic volumes are expected to almost double by 2035.
  - Truck traffic is projected to grow at a faster rate than general traffic.
  - Over 90 percent of I-81 is projected to operate below the level of service standard in 2035 (see Figure 2-6 in Chapter 8, *Figures*).

- Safety
  - 24 northbound miles (7 percent) and 21 southbound miles (6 percent) have crash rates more than 25 percent higher than the statewide average.
  - Eight of these miles have crash rates more than twice the statewide average.
  - Trucks constitute 29 percent of the total vehicle miles traveled on I-81 between 2000 and 2002, and trucks were involved in 29 and 30 percent of all crashes and fatal crashes, respectively.
  - Safety is a problem at some locations today and could worsen by 2035, as traffic volumes increase and existing geometric conditions remain.

  The geometric conditions of the highway, combined with speed and weather conditions, are contributing factors to some crashes along I-81. Sections of I-81 in Virginia are more than 40 years old and do not meet current American Association of State Highway Transportation Officials (AASHTO) geometric design criteria. As part of previously completed studies, a review of I-81 showed that geometric conditions that do not meet current AASHTO geometric design criteria include:

- More than two-thirds of I-81 in Virginia has inside shoulder widths that do not meet current AASHTO geometric design criteria, based on the volume of heavy vehicles using the corridor.
- More than 100 locations have sight distances that do not meet current AASHTO geometric design criteria because of the alignment of the highway.
- Ten locations have conditions that slow truck traffic to speeds below the minimum for interstate travel due to steep grades.
- Approximately 53 bridges (42 percent) have vertical clearances that do not meet the design criteria established in the VDOT Design Manual.

ES.4 Improvement Concepts

A broad range of reasonable improvement concepts were considered within the guidelines of the process streamlining agreement between FHWA and VDOT. Some concepts emerged from the scoping process, some came from previous studies, and other corridor-length concepts were developed by the study team. The No-Build Concept and 211 combinations of Transportation System Management (TSM), highway improvements, rail improvements, and various toll scenarios were considered as described below. Additional information is also available in the *I-81 Corridor Improvement Study Concept Development Technical Report*.

Improvement Concepts

No-Build – The No-Build Concept consists of the I-81 roadway as it exists in 2005 plus 16 construction projects included in the *Virginia Transportation Six-Year Improvement Program for Fiscal Years 2006 – 2011* and Metropolitan Planning Organizations' Long Range Plans that are fully funded through construction. It was assumed that these projects would be completed by 2035. The funds to build those improvements (each of which are programmed for construction) are included in the *Virginia Transportation Six-Year Improvement Program for Fiscal Years 2006 -2011*.

Transportation System Management (TSM) – The TSM concept consists of safety improvements (*e.g.*, lengthening of acceleration lanes at interchanges), truck climbing lanes, Intelligent Transportation System (ITS) elements, law enforcement, and park-and-ride projects.

Rail Concepts – Four rail concepts were studied, all of which involved rail lines owned by Norfolk Southern Railroad (NS).

- Rail Concept 1 – Minor improvements to the Norfolk Southern Piedmont Line from the West Virginia state line to Manassas, including the section from Front Royal to Manassas.

- Rail Concept 2 – Improvements to the Norfolk Southern Piedmont Line in nine sections including the section from Front Royal to Manassas. Proposed in the *Northeast-Southeast-Midwest Corridor Marketing Study* as the Virginia-based investment scenario.
- Rail Concept 3 – All improvements to the Norfolk Southern Piedmont Line included in Rail Concept 2, as well as minor improvements to the Norfolk Southern Shenandoah Line.
- Rail Concept 4 – Full-level improvements to the Norfolk Southern Shenandoah Line and new rail freight hauling technology that interfaces with intermodal centers at strategic locations along I-81. Proposed during the Scoping Process by Rail Solution.

The effects of rail improvements on the diversion of freight from I-81 to rail was modeled. This analysis is detailed in the *I-81 Corridor Improvement Study Freight Diversion and Forecast Report*. The results indicate that the construction of rail improvements alone would only slightly reduce the number of lane miles needed on I-81 in Virginia. Table ES-1 illustrates the percent of trucks that are projected to divert from I-81 in 2035.

Table ES-1 Rail Truck Diversion Percentages

Rail Concept #	% Truck Diversion
Rail Concept 1	0.7
Rail Concept 2	2.9
Rail Concept 3	3.5
Rail Concept 4	5.8

Roadway Concepts – Five consistent corridor-length roadway concepts were evaluated. Each roadway concept was evalauted with five different toll scenarios: 1) no toll, 2) low toll for all vehicles, 3) high toll for all vehicles, 4) low toll for commercial vehicles only, and 5) high toll for commercial vehicles only.

- Add 1 Lane – One additional lane in each direction (two lanes total) the entire 325 miles and upgraded shoulders.
- Add 2 Lanes – Two additional lanes in each direction (four lanes total) the entire 325 miles and upgraded shoulders.
- Add 3 Lanes – Three additional lanes in each direction (six lanes total) the entire 325 miles and upgraded shoulders.
- Uniform 6-Lanes – Provides additional lanes, where necessary, to make the entire corridor a consistent 3-lanes in each direction and upgraded shoulders.
- Uniform 8-Lanes – Provides additional lanes, where necessary, to make the entire corridor a consistent 4-lanes in each direction and upgraded shoulders.

Combination Concepts – Each of the five roadway concepts described above were combined with Rail Concept 3 to produce a total of five combination concepts. Rail Concept 3 was chosen as the rail concept to use in combination with highway improvements because it provides the most diversion of freight from truck to rail per dollar of investment. Each combination concept was also evalauted with five different toll scenarios.

Separated Lane Concepts – Five concepts that involve the separation of truck and general purpose (GP) lanes were considered and were divided into two types: 1) those involving exclusive separated lanes and 2) those involving non-exclusive separated lanes. Exclusive lanes are barrier-separated lanes with separate interchange ramps to all the interchanges along the roadway. Non-exclusive lanes provide a rumble strip between the separated lanes and the other lanes, which allows vehicles in the separated lanes to merge into the other lanes and also to use the existing interchange ramps. Separated lane concepts were evaluated with five toll scenarios, with Rail Concept 3, and without Rail Concept 3. In addition, these concepts were considered in combination with the addition of zero, one, and two general purposes lanes in each direction.

Table ES-2 summarizes costs for each of the concepts described above. The *Concept Development Technical Report* provides a more detailed breakdown of the costs for each improvement concept. These costs may change during Tier 2, if a "Build" concept (or portion of a "Build" concept) is advanced, based on more site-specific information.

Table ES-2 Concept Costs

	Cost	
Concept	2005	2015
No-Build	*	*
TSM	$0.08 billion	$0.1 billion
Rail Concepts		
Rail Concept 1	$0.1 billion	$0.14 billion
Rail Concept 2	$0.5 billion	$0.7 billion
Rail Concept 3	$0.5 billion	$0.7 billion
Rail Concept 4	$3.7 billion	$5.4 billion
Roadway Concepts		
Add 1 Lane	$5.1 billion	$7.5 billion
Add 2 Lanes	$7.8 billion	$11.4 billion
Add 3 Lanes	$11.2 billion	$16.4 billion
Uniform 6-Lanes	$4.9 billion	$7.2 billion
Uniform 8-Lanes	$7.5 billion	$11.0 billion

Table ES-2 Concept Costs (Continued)

Concept	Cost 2005	Cost 2015
Combination Concepts		
Add 1 Lane + Rail Concept 3	$5.6 billion	$8.2 billion
Add 2 Lanes + Rail Concept 3	$8.3 billion	$12.2 billion
Add 3 Lanes + Rail Concept 3	$11.7 billion	$17.1 billion
Uniform 6-Lanes + Rail Concept 3	$5.4 billion	$7.9 billion
Uniform 8-Lanes + Rail Concept 3	$8.0 billion	$11.7 billion
Separated Lane Concepts[1]		
Add 1 Exclusive Truck Lane + Add 1 or 2 GP Lanes	$11.2 – 12.7 billion	$16.4 – 18.6 billion
Add 2 Exclusive Truck Lanes + Add 0, 1, or 2 GP Lanes	$11.2 – 13.0 billion	$16.4 – 19.0 billion
Add 2 Non-Exclusive Truck Lanes + Add 0, 1, or 2 GP Lanes	$ 9.3 – 10.8 billion	$13.6 – 15.8 billion
Add 2 Exclusive Car Lanes + Add 0, 1, or 2 GP Lanes	$11.2 – 13.0 billion	$16.4 – 19.0 billion
Add 2 Non-Exclusive Car Lanes + Add 0, 1, or 2 GP Lanes	$11.2 – 13.0 billion	$16.4 – 19.0 billion

* The costs necessary to build those improvements (each of which are programmed for construction) can be found in the *Virginia Transportation Six-Year Improvement Program for Fiscal Years 2006 -2011*.
1 Separated lane concepts were evaluated with and without Rail Concept 3.

The concepts' ability to address the capacity portion of the Purpose and Need was noted in terms of: 1) the number of miles of I-81 that would continue to operate below level of service standards after the concept was built (described in Chapter 2, *Purpose and Need*), and 2) the number of miles where excess capacity (more lanes than needed to provide level of service at or above standards) would be provided.

Key conclusions reached based on the analysis were as follows:

- The No-Build Concept does not satisfy the Purpose and Need.
- TSM and the rail concepts, as stand-alone concepts, do not satisfy the Purpose and Need; however, both could compliment roadway improvements.
- Rail improvements do not eliminate the need for road improvements since they make only a slight change to the number of lanes needed on I-81 in Virginia. With the implementation of Rail Concept 3, the number of miles on I-81 that need two or more lanes would be reduced by 30 miles (out of the total 650 miles) as a result of reduced demand on the interstate.
- No single consistent corridor-length concept satisfies the capacity needs of I-81 in Virginia without providing excess capacity (more lanes than are needed) in some locations.

- The addition of one lane in each direction satisfies the Purpose and Need for approximately 37-64 percent of the corridor, depending upon the toll scenario.
- No concept with two additional separated lanes in each direction, regardless of configuration, satisfies the Purpose and Need for the entire corridor without providing excess capacity (more lanes than needed) in some locations.
- Based on the varying traffic demands, a concept with a variable number of lanes would most efficiently address the capacity needs of the roadway.

Tolls

A toll impact study was conducted for the purpose of determining the effect of tolls on the I-81 corridor and the effects of traffic diversion to other facilities. The study was not conducted to establish toll rates on I-81. The effect of tolls was estimated by modeling diversions from I-81 to other transportation facilities. The study evaluated tolls for all vehicles, as well as tolls for trucks only. Five toll scenarios were considered: 1) no tolls, 2) low toll for all vehicles, 3) high toll for all vehicles, 4) low toll for trucks, and 5) high toll for trucks. The low and high toll rates were derived from national research and represent a reasonable rate that could be charged. Detailed information are provided in the *I-81 Corridor Improvement Study Toll Impact Study*.

Generally, the higher the toll, the more diversion of traffic from I-81 to other facilities, which reduces the number of required lanes on I-81. Also, trucks are less likely to divert from I-81 than passenger cars because a commercial trucker's value of time is higher than that of a passenger car. In other words, the additional time a trucker would need to travel on another facility may be more costly to the trucker than the toll itself. A summary of the average diversion estimates due to tolls, from an improved I-81 in 2035, is shown in Table ES-3.

Table ES-3 Summary of Diversion Estimates Due to Tolls

	Tolls for All Vehicles		Tolls for All Commercial Vehicles	
	Low Toll	High Toll	Low Toll	High Toll
All Vehicles				
Average Diversion from I-81	8%	16%	2%	9%
Trucks				
Average Diversion from I-81	3%	11%	12%	25%

Between 2005 and 2035, traffic volumes without tolls are expected to double on a majority of U.S. Route 11 in Virginia. Roadway improvements will likely be necessary on U.S. Route 11 regardless of whether improvements are made to I-81, and regardless of whether tolls are implemented.

An expanded I-81 without tolls would generally improve conditions on U.S. Route 11 and other local roadways in the I-81 study area by diverting traffic from these local roadways to the interstate. This is especially true in the more populated and urban areas.

The implementation of a low toll on an improved I-81 would gradually begin to shift traffic back to the local roadway network, although in most locations traffic volumes would still be below 2035 No-Build predictions. However, the implementation of higher tolls on an improved I-81 would result in slight increases in local traffic throughout much of the study area as compared to the No-Build condition. Even though about half of the traffic would divert to U.S. Route 11, the resulting increase is slight for this type of roadway (a rural principal arterial) and the overall impact is low. The impact of tolls on the traffic operations of the local roadways would not be substantial. Areas with a high potential for local roadway impacts are sporadic throughout the corridor. Other parallel facilities would experience an even smaller impact due to traffic diversion.

Under the tolling scenarios, large volume increases are not anticipated at any location on U.S. Route 11 as a result of diversion. In most locations, with an improved I-81, traffic volumes along U.S. Route 11 would still be below 2035 No-Build projections. With regard to trucks, if all vehicles are tolled, an expanded I-81 would decrease truck traffic on local roadways to levels below what are projected under 2035 No-Build conditions.

Nearly 50 percent of the traffic diverted from I-81 would be absorbed by U.S. Route 11. The remaining traffic diverted from I-81 is distributed among other local roads, as well as other interstates (*i.e.* I-64 and I-95). Under the low toll scenario, the amount of traffic increases on the local road network, although in most locations traffic volumes would still be below 2035 No-Build conditions. Although implementation of higher tolls on I-81 would result in a slight gain in traffic volumes on U.S. Route 11 (and other local roads) and other interstate facilities as compared to the No-Build condition, the actual traffic impacts on these roads resulting from the number of additional vehicles would be low.

It is inconsistent with existing federal transportation law to toll an interstate facility unless improvements are made to the facility. In addition, the use of tolls collected on an interstate to make improvements to other modes of transportation (*e.g.*, railroads) is prohibited. Therefore, concepts that considered tolls, but did not include highway improvements, are not considered viable.

Improvement Concepts Under Consideration

In 2035, 37 percent of I-81 needs one additional lane in each direction. Specifically, these sections are from:

- Exit 3 to Exit 5 northbound;
- Exit 19 to Exit 81 northbound;
- Exit 162 to Exit 168 northbound;
- Exit 243 to Exit 245 northbound;
- Exit 247 to Exit 251 northbound;
- Exit 257 to Exit 269 northbound;
- Exit 273 to Exit 279 northbound;
- Exit 310 to Exit 313 northbound;
- Exit 7 to Exit 10 southbound;
- Exit 17 to Exit 84 southbound;
- Exit 86 to Exit 89 southbound;
- Exit 96 to Exit 101 southbound;
- Exit 105 to Exit 109 southbound;
- Exit 114 to Exit 118 southbound;
- Exit 156 to Exit 167 southbound;
- Exit 168 to Exit 191 southbound;
- Exit 243 to Exit 251 southbound;
- Exit 264 to Exit 277 southbound; and
- Exit 310 to Exit 313 southbound;

For these sections, the "Build" concepts under consideration are only those that provide for one additional lane in each direction.

Most of the remaining sections of I-81 need more than one lane in each direction in 2035.[1] Decisions on improvements to those sections (*e.g.*, the separation of cars from commercial vehicles) would be determined in Tier 2 when more site-specific information is available, if a "Build" concept (or portion of a "Build" concept) is advanced. In addition, the application of tolls or improvements to rail facilities would decrease the number of vehicles on I-81. Such a reduction would reduce the number of miles on I-81 that need more than one additional lane in each direction. Decisions on the number of lanes to be constructed for sections that need more than one lane, and their configuration, would be made at the conclusion of Tier 2, if a "Build" concept (or portion of a "Build" concept) is advanced.

ES.5 Environmental Consequences

The potential impacts of the improvement concepts on the natural and human environment were analyzed at a level of detail appropriate for Tier 1.

Consistent with a tiered approach, potential impacts in the I-81 corridor are presented for the narrowest highway footprint and the widest highway footprint. Referred to as Minimum Width and the Maximum Width, these footprints represent concepts that were based on transportation needs identified in Chapter 2, *Purpose and Need*. Both impact footprints have a variable number of additional lanes for the length of I-81 (ranging from two additional lanes to eight additional lanes) depending on the transportation needs along the corridor.

1 Two percent of the corridor, between the Tennessee state line and Exit 7, generally does not need any additional lanes in 2035 except for two miles in the northbound lane only, between Milepost 3 and Milepost 5.
.

On sections of I-81 that need one additional lane in each direction, both footprints add a total of two lanes (one lane in each direction). On sections of I-81 that need two lanes in each direction, the need can be met by different means: 1) a total of four additional lanes can be added, or 2) various operational scenarios can be implemented (*e.g*. separation of general purpose lanes and truck lanes) that would meet the needs but would require the construction of up to eight additional lanes in order to operate efficiently. Where at least four lanes are needed, the Minimum Width footprint provides a total of four additional lanes (two lanes in each direction), and the Maximum Width footprint provides a total of eight additional lanes (four in each direction).

When evaluating the number of lanes needed for sections of I-81, a "no toll" and "no rail" base condition was assumed for the Minimum Width and Maximum Width footprints. This base condition assumption represents the highest traffic volumes and therefore the greatest number of lanes that may be needed on I-81. If a "Build" concept (or portion of a "Build" concept) is advanced, the footprint of any of the improvements is anticipated to fall between the limits of the Minimum Width and Maximum Width footprints. The width of the variable Minimum Width footprint ranges from roughly 240 feet (where a total of two lanes are added) to 430 feet (where a total of four lanes are added) depending on the location. In comparison, the variable Maximum Width footprint ranges from 240 feet (where a total of two lanes are added) to 540 feet (where a total of eight lanes are added). These widths include existing pavement and new pavement. For the Minimum Width footprint, widening occurs in the median of I-81 to the extent possible. Conversely, the Maximum Width footprint widens to the outside right edge of I-81.

Potential impacts were also calculated for the Add 2-Lanes concept and Add 8-Lanes concept for illustrative purposes. Unlike the Minimum Width and Maximum Width footprints that both add either two or more lanes in each direction along the length of I-81, the Add 2-Lane concept consistently adds a total of two lanes the entire length of I-81 and the Add 8-Lanes concept consistently adds a total of eight additional lanes.

In addition, a footprint was developed to assess potential impacts associated with Rail Concept 3. Rail Concept 3 was chosen as the most appropriate rail concept to combine with roadway concepts because it provides the most diversion of freight from truck to rail per dollar of investment. The footprint, generally 100 feet wide, represents the limits of potential rail construction for the 13 rail improvement sections that comprise Rail Concept 3. The potential impacts associated with Rail Concept 3 can be added to the I-81 "Build" concepts to consider the total potential effects of highway plus rail improvements.

Potential direct impacts were calculated by superimposing the above described footprints over geographical information systems (GIS) data available for each resource. Each footprint represents the potential limits of construction. Where the footprint and GIS data overlapped, an impact was assumed.

It is important to note that the potential impacts in this Tier 1 study are preliminary since they are based largely on available Geographic Information Systems (GIS) resource data and concept-level analyses. The actual numbers may decrease during Tier 2 as a result of more detailed field investigations and highway and/or rail design, if a "Build" concept (or portion of a "Build" concept) is advanced.

Overall, potential impacts for the "Build" concepts on I-81 are similar, and in many cases do not vary substantially. The primary reason for this is that a large percent of impacts occur within the 91 interchange areas, and the footprints at interchanges do not vary substantially between "Build" concepts. The Minimum Width footprint generally has less potential impacts than the Maximum Width because the Minimum Width template is slightly narrower in those areas where more than two additional lanes are needed. Some potential effects, however, such as air quality, noise, energy, and economics, may be influenced by other considerations than just the physical footprint of the "Build" concepts. As a result, the Minimum Width footprint has slightly higher potential negative impacts to air quality, energy consumption, and economics because there are fewer travel lanes, resulting in more congestion and less efficient travel. The potential impacts associated with Rail Concept 3 are substantially less than the I-81 "Build" concepts.

The economics analysis factored in the potential effects of various toll scenarios. Although tolls have slight negative impact on the economy, this is offset by the potential benefits of an improved facility, resulting in a net improvement in the economic conditions in 2035. Even with tolls, the economic conditions are better in 2035 with the "Build" concepts than without the "Build" concepts.

Approximately 50 percent of traffic diverted off of I-81 as a result of tolls would use U.S. Route 11. Based on a qualitative evaluation of the potential effects on the environment from traffic diverting to U.S. Route 11 and other local roads, the impacts are not anticipated to be substantial because the number of vehicles traveling on U.S. Route 11 would not be substantially changed from future conditions. About 14 percent of freight traffic diverted off of I-81 would use I-95 as an alternate route, and approximately 15 percent would use I-65/I-64/I-79. These diversions are not expected to have a measurable impact to traffic operations on parallel interstates. Therefore, the environmental impacts on parallel interstate facilities as a result of toll diversion would be inconsequential.

Table ES-4 summarizes the potential environmental consequences associated with the No-Build Concept and "Build" concepts as described. Detailed information on historic properties and wetlands and water resources is also available in the *I-81 Corridor Improvement Study Historic Properties Technical Report* and *the I-81 Corridor Improvement Study Wetlands and Water Resources Technical Report*, respectively.

Table ES-4 Summary of Potential Environmental Consequences[1]

Resource / Issue	No-Build	Minimum Width	Maximum Width	Rail Concept 3	Add 2-Lanes	Add 8-Lanes
Consistency with Local Plans	Varies	Varies	Varies	Varies	Varies	Varies
Developed Land Use (acres)	N/E[2]	7,409	7,556	45	7,247	8,105
Prime Farmland Impacts (acres)	N/E[2]	1,062	1,420	51	1,022	1,580
Agricultural/Forestal District Impacts (acres)	N/E[2]	31	141	21	31	176
Residential Displacements (#)	N/E[2]	926	1,595	0	944	2,068
Business Displacements (#)	N/E[2]	662	763	1	684	897
Community Facilities Impacted (#)	N/E[2]	5	5	0	5	5
Minority Population Impacts (# of block groups affected)	N/E[2]	20	20	0	20	20
Low-Income Population Impacts (# of block groups affected)	N/E[2]	27	27	0	27	27
2035 Employment Growth (increase from 2005)	0%	4.7%[3]	---	---	4.7%[2]	---
2035 Gross Regional Product Growth (increase from 2005)	0%	4.2%[3]	---	---	4.2%[2]	---
Parks and Recreation Area Impacts (acres)	N/E[2]	51	69	2	51	84
Open Space Easement Impacts (acres)	0	12	29	0	12	34
Visual Impacts (# of visual resources with view of the road/rail)	N/E[2]	28	28	5	28	28
Potential Contamination Sites (#)	N/E[2]	9	9	0	9	9
Battlefield Impacts (acres)	N/E[2]	1,238	1,481	13	1,213	1,622
Impacts to NHRP Listed/Eligible Historic Districts (acres)	N/E[2]	51	58	1	52	60.5
Impacts to NHRP Listed/Eligible Historic Structures (#)	N/E[2]	19	20	2	19	20
NHRP Listed Archaeological Sites Impacted (#)	N/E[2]	1	1	0	1	1
Wetland Impacts (acres)	N/E[2]	33	51	8	33	63
Stream Impacts (miles)	N/E[2]	23.1	29.1	1.4	23	35
100-Year Floodplains Impacted (acres)	N/E[2]	361	458	50	354	530
Threatened and Endangered Species Impacted (# of species)	N/E[2]	12	12	0	13	13
Volatile Organic Compounds (VOCs) (tons/day)	7.43	+ 0.36[4]	- 1.24[4]	+ 0.28[5]	+0.36[3]	-1.24[3]
Nitrogen Oxides (NO_x) (tons/day)	8.78	+ 0.81[4]	- 1.15[4]	+ 5.13[5]	+0.81[3]	-1.15[3]
Particulate Matter (PM2.5) (tons/day)	0.33	+ 0.02[4]	- 0.05[4]	+ 0.17[4]	+0.02[3]	-0.05[3]
Noise Sensitive Receptors Impacted (# increase over No-Build)	------	+ 4,015	+ 5,090	+ 137	+3,034	+5,538

1 The potential effects in this Tier 1 study are preliminary since they are based largely on available GIS resource data and concept-level analyses. The actual numbers may decrease during Tier 2 as a result of more detailed investigations and highway and/or rail design, if a "Build" concept is advanced.

2 NE = Not Evaluated for Tier 1. Each roadway improvement project included in the No-Build has either completed or is currently undertaking the NEPA process independent of the *I-81 Corridor Improvement Study*. All impacts to resources either have been or will be addressed through those separate documents.

3 While economic effects from the range of "Build" concepts differ, the range of economic effects is extremely small. Therefore, potential economic effects are only reported for the No-Build and the Minimum Width template (with an No Toll scenario and with Rail Concept 3) because it can be considered to be representative of the economic effects from the "Build" concepts in general.

4 Change in emissions from 2035 No-Build highway condition.

5 Change in emissions from 2035 No-Build rail condition. These emissions are based on rail improvements only.

ES.6 Tier 1 Decisions

As mentioned previously, upon completion of the Tier 1 study, decisions will be made on:

- the improvement concepts for highway and rail facilities;
- advancing I-81 as a toll pilot under Section 1216(b) of the Transportation Equity Act for the 21st Century (TEA-21);
- projects with independent utility and logical termini to be studied in Tier 2;
- the types of Tier 2 NEPA document(s);
- the location of the corridor for studying alignments in Tier 2; and
- possible purchase of certain right-of-way parcels on a case-by-case basis.

In addition to these decisions, each of which are discussed below, the Tier 1 DEIS documents existing and future needs along the corridor. In short, improvements are needed to improve safety and increase capacity along I-81.

Improvement Concepts

Improvement concepts that were considered include the No-Build Concept and various "Build" concepts previously described. If a "Build" concept (or portion of a "Build" concept) is advanced into Tier 2, subsequent Tier 2 NEPA documents prepared for individual, independent projects would address more site-specific details.

Tolls

The impacts on U.S. Route 11 and other roads (both local roads and other interstate facilities) from traffic that is diverted from I-81 as a result of tolls are low.

If appropriate, FHWA would grant provisional approval to VDOT for tolling I-81 at the conclusion of Tier 1. Therefore, comments are being solicited on the potential tolling of I-81 in Virginia as part of the toll application process.

Sections of Independent Utility and Tier 2 Documentation

A practical approach to improving I-81 throughout Virginia is to break the entire corridor into sections and undertake more detailed studies on a series of projects that are consistent with the overall purpose and need in this Tier 1 EIS. Based upon traffic exchanges and service demands, each section is independent, useful, and stands on its own merits within the

framework of this Tier 1 EIS. Each of these sections is referred to as a Section of Independent Utility (SIU). The SIUs apply to the roadway portion of the "Build" concepts.

Eight individual SIUs have been identified for subsequent refinement of the improvements and processing of the environmental documents, if a "Build" concept is advanced (see Table ES-5). Smaller independent projects (for example, truck climbing lanes, bridge replacements, or interchange improvements) within these SIUs may be identified subsequent to the completion of Tier 1. Some of these projects may include Transportation System Management improvements.

Table ES-5 Sections of Independent Utility (SIU) and Additional General Purpose Lane Requirements

SIU Termini		Number of Additional General Purpose Lanes Needed[1]	
From	To	Northbound	Southbound
1. Tennessee state line	Exit 72 (I-77) near Wytheville	No lanes from Milepost 0 to Exit 3 One lane from Exit 3 to Exit 5 No lanes from Exit 5 to Exit 7 Two lanes from Exit 7 to Exit 19 One lane from Exit 19 to Exit 72	No lanes from Milepost 0 to Exit 7 One lane from Exit 7 to Exit 10 Two lanes from Exit 10 to Exit 17 One lane from Exit 17 to Exit 72
2. Exit 72 (I-77) near Wytheville	Exit 81 (I-77) near Wytheville	One lane from Exit 72 to Exit 81	One lane from Exit 72 to Exit 81
3. Exit 81 (I-77) near Wytheville	Exit 118 (U.S. Route 460) near Christiansburg	Two lanes from Exit 81 to Exit 118	One lane from Exit 81 to Exit 84 Two lanes from Exit 84 to Exit 86 One lane from Exit 86 to Exit 89 Two lanes from Exit 89 to Exit 96 One lane from Exit 96 to Exit 101 Two lanes from Exit 101 to Exit 105 One lane from Exit 105 to Exit 109 Two lanes from Exit 109 to Exit 114 One lane from Exit 114 to Exit 118
4. Exit 118 (U.S. Route 460) near Christiansburg	Exit 143 (I-581) in Roanoke County	Two lanes from Exit 118 to Exit 143	Two lanes from Exit 118 to Exit 143
5. Exit 143 (I-581) in Roanoke County	Exit 221 (I-64) near Staunton	Two lanes from Exit 143 to Exit 162 One lane from Exit 162 to Exit 168 Two lanes from Exit 168 to Exit 221	Two lanes from Exit 143 to Exit 156 One lane from Exit 156 to Exit 167 Two lanes from Exit 167 to Exit 168 One lane from Exit 168 to Exit 191 Two lanes from Exit 191 to Exit 221
6. Exit 221 (I-64) near Staunton	Exit 247 (U.S. Route 33) in Harrisonburg	Two lanes from Exit 221 to Exit 243 One lane from Exit 243 to Exit 245 Two lanes from Exit 245 to Exit 247	Two lanes from Exit 221 to Exit 243 One lane from Exit 243 to Exit 247

Table ES-5 Sections of Independent Utility (SIU) and Additional General Purpose Lane Requirements (Continued)

SIU Termini		Number of Additional General Purpose Lanes Needed[1]	
From	To	Northbound	Southbound
7. Exit 247 (U.S. Route 33) in Harrisonburg	Exit 300 (I-66) in Warren County	One lane from Exit 247 to Exit 251 Two lanes from Exit 251 to Exit 257 One lane from Exit 257 to Exit 269 Two lanes from Exit 269 to Exit 273 One lane from Exit 273 to Exit 279 Two lanes from Exit 279 to Exit 300	One lane from Exit 247 to Exit 251 Two lanes from Exit 251 to Exit 264 One lane from Exit 264 to Exit 277 Two lanes from Exit 277 to Exit 300
8. Exit 300 (I-66) in Warren County	West Virginia state line	Two lanes from Exit 300 to Exit 310 One lane from Exit 310 to Exit 313 Two lanes from Exit 313 to Milepost 325	Two lanes from Exit 300 to Exit 310 One lane from Exit 310 to Exit 313 Two lanes from Exit 313 to Milepost 325

1 Separated Lane Concepts would also be evaluated for those sections of I-81 that require more than one lane.

The Sections of Independent Utility are related to the roadway component of the "Build" concepts only.The construction sequence and sections for rail improvements would occur at the discretion of Norfolk Southern.

This Tier 1 EIS provides information on the nature of the "Build" concepts, and the potential impacts associated with those concepts. The significance of the actual physical impacts of individual projects is currently unknown. If in Tier 1, one or more of the "Build" concepts (or portions of "Build" concepts) are advanced into Tier 2, Environmental Assessments (EAs) or categorical exclusion documents (CEs) are proposed as the type of Tier 2 NEPA document for each SIU. In accordance with 23 CFR 771.117(d), CEs could only be prepared if it is clear that the environmental effects of the action would not be significant. The EAs or CEs would be the means through which the detailed analyses associated with Tier 2 would be conducted. For any smaller independent projects within the SIUs, CEs may be prepared. Based on the detailed information in the EAs or CEs, informed decisions would be made on the significance of the impacts. Depending on the nature of the impacts, the EAs or CEs may evaluate in detail one "Build" alternative.

Potential Corridors on New Location

There are two locations along I-81 where the potential impacts from the I-81 improvement concepts, especially displacements, may rise to the level where a corridor on new location may be prudent. These sections are the I-77 overlap section near Wytheville (Milepost 72 to 81within SIU #2) and a section in Harrisonburg (Milepost 243 to 251 within SIUs #6 and #7). At these locations, FHWA and VDOT propose to evaluate corridors on new location, as

well as widening the existing facility, if a "Build" concept (or portion of a "Build" concept) is advanced into Tier 2.

Possible Right-of-Way Purchases

This Tier 1 DEIS provides information to support decisions on hardship acquisitions or protective purchases of specific right-of-way parcels in the future on a case-by-case basis.

ES.7 Agency Coordination and Public Participation Process

Coordination with local, state, and federal agencies and the public was conducted during the formal scoping process and throughout the *I-81 Corridor Improvement Study*. The scoping process began at the initial stages of the study with a series of seven public scoping meetings attended by a total of 358 people, meetings with local officials prior to each public meeting, and an agency scoping meeting. These meetings were held in February, 2004 and resulted in approximately 1,100 comments from a total of 244 different commenters. The early scoping process was completed in the spring of 2004 and is summarized in the *I-81 Corridor Improvement Study Scoping Summary Report*.

Meetings and correspondence continued with local, state, and federal agencies, and interest groups throughout the study. Additional forums for discussion throughout the study included three formal Partnering Meetings with federal resource agencies, interviews with city/county planners and administrators, coordination with the Virginia Department of Rail and Public Transportation as well as Norfolk Southern, and other miscellaneous meetings. Correspondence was received from approximately 16 interest groups including Rail Solution, Virginians for Appropriate Roads, and Shenandoah Valley Battlefields Foundation. Information about the progress of the study was provided through press releases, newsletters, and a project website which included a direct e-mail link.

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